M/019/005

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October 2, 1989

Mr. Rick York, General Manager
Moab Salt, Inc.
P. O. Box 1208
Moab, Utah 84532

Re: August 10, 1989 Conceptual Plan, Study of the Potential Salt Loading of Local Hydrology, Moab Salt Inc.

Dear Mr. York:

We have reviewed the conceptual plan referenced above, our files, previous correspondence, and the discussions of our June 7, 1989 meeting, summarized in your letter of June 16, 1989 and ours of July 25, 1989. As a result of our review, we have found your current conceptual plan to be inadequate at addressing several issues regarding the loss of brine to the environment from your operation. These concerns are detailed in the attached comments.

Please modify the plan to address the attached issues. We encourage you to resolve these concerns within 30 days. If you have any questions or comments, please feel free to call Steve McNeal or Loren Morton at 538-6146.

Sincerely,

Don A. Ostler

Don A. Ostler, P.E., Director
Bureau of Water Pollution Control

Attachment

cc: Dave Arriotti, Southeastern District Health Department
Jack Barnett, Colorado River Salinity Forum
Holland Shepard, Division Oil, Gas & Mining
Fred Nelson, Assistant Attorney General
Scott Groene, Southern Utah Wilderness Alliance

LBM:st
Q:MSConcep

CONCEPTUAL PLAN, STUDY OF THE POTENTIAL SALT LOADING ON LOCAL HYDROLOGY,

MOAB SALT INC. AUGUST 10, 1989

BUREAU OF WATER POLLUTION CONTROL COMMENTS

Storm Water Runoff Characteristics (Section 2.0)

1. Surface Water Sampling Points (Section 2.1) - Surface water sampling, proposed to begin October 1, 1989, should also include the following parameters of analysis:
   - Magnesium
   - Carbonate
   - Bicarbonate
   - Total Dissolved Solids
   - Total Suspended Solids

2. Spring/Seep Sampling (Section 2.1) - Spring and seep sampling should include all the field measurements and lab analyses required of surface runoff. Sampling frequency should be at least quarterly and should continue for the same length of time as the surface runoff sampling (see Table I).

3. Reporting (Section 2.1) - Reporting of all field and laboratory analyses should be submitted quarterly to the Bureau, as per the following schedule:

Quarter	Report Due on:
January - March	April 30
April - June	July 30
July - September	October 30
October - December	January 30

4. Historical Data Evaluation (Section 2.3) - Our review of EPA's Storet database system, which includes water quality data available from Federal and State agencies shows a limited amount of data at four sampling points:

Relative Location	Source	Storet No.	Description
Upstream	BLM	495700	Colorado River at bridge on U-163, north of Moab
Upstream	BWPC	495654	Colorado River at The Portal, west of Moab (see Moab 7 1/2 minute quadrangle map)
At the Site	BWPC	495590	River water intake at texasgulf
Downstream	BLM	495586	Colorado River below Moab Salt

If Moab Salt were to use data from the sampling points farther up or downstream from these locations, the company would need to assess the validity of correlation. Any review of historical data on the river must also include all the field and laboratory parameters required for surface water at the mine site.

5. Seep/Spring Inventory (Section 2.4) - Much of this survey work has already been completed in the vicinity of the mine as a part of your UIC permit application (see "Geology and Ground Water Hydrology in the Vicinity of the Texasgulf Chemicals Company Potash Solution Mine, Grand and San Juan Counties, Utah, by Peter Huntoon, July 19, 1985, Figure 2) and was also included in your August 19, 1987 Notice of Intention to Commence Mining Operation and Mining and Reclamation Plan or MRP prepared for DOGM (Appendix 1, Figure 2).

After comparison of Figure 1 of your August 10, 1989 plan with Figure 2 of Huntoon's July 19, 1985 report it is clear that additional seep/spring inventory work and sampling could be done to support the proposed surface runoff sampling points Nos. 1 and 10.

6. Length of Study and Potential Future Action (Section 2.5) - No explanation is provided for why surface water studies should continue for 2 years before any conclusions can be reached, or further action taken. It is imperative that these studies be completed as quickly as possible, in that the seepage is from the Evaporation Ponds and the Nos. 1 and 3 Canyon Collection Systems is an apparent unauthorized discharge of wastewater to waters of the State.

Ground Water Characterization (Section 3.0)

1. Water Balance (Section 3.1)

   a) Evaporation Rate - No information has been provided on how the evaporation rate will be independently determined for the evaporation ponds and the brine lake.

   b) Water Balance Accuracy - Any water balance should be couched in terms of a range, with each factor of uncertainty explained, i.e. accuracy of flow meters, brine lake level adjustments, evaporation rate measurements, etc.

   c) Brine Lake Volume Adjustments - How will brine lake volume be calculated and brine lake level adjustments be made?

2. Mobley Dam/No. 3 Canyon Collection System (Section 3.2)

   a) Operation Life - If the No. 3 Canyon collection system is to be reactivated as an interim measure; how long does Moab Salt plan to keep it in operation?

   b) Well Approvals - Any monitoring or recovery wells installed will require prior approval of number, design, location, and sampling methods and frequency. Such approval will require hydrogeological data to justify the number and location of the wells. Monitoring well design, construction and ground water sampling should follow the requirements of the Ground Water Quality Protection Regulations [UAC R448-6-6.3A(9)]. The compliance schedule on Table 1 of your submittal should include a milestone for monitoring/recovery well plan submittal and construction. Well plan submittal should be accomplished by December 1, 1989. Collection of data from the monitoring wells should begin immediately after construction.

   c) Monitoring Well Installation - Monitoring wells should be installed and ground water levels measured to establish baseline flow conditions and ground water quality before operation of any recovery wells. This data will help document the effectiveness of the recovery wells.

   d) Ground Water Monitoring & Reporting - Ground water levels will be measured in the monitoring wells, and ground water samples collected at least on a quarterly basis. Following initial startup of the recovery wells, ground water levels should be measured more frequently, perhaps even weekly. Reporting of all ground water monitoring and sampling should be at least quarterly.

   e) Mobley Dam Design - What size of storm will the Mobley Dam and the check dams be able to retain?

3. Evaporation Ponds (Section 3.3)

a) Water Balance Stipulation and Relining Priority - The evaporation ponds are known to leak as demonstrated by visual observations in the No. 1 and No. 3 canyons, water analyses taken from the No. 3 Canyon Collection System, and by your own admission. The purpose of the water balance effort is to estimate the volume of the leakage, not determine if they leak. Therefore, ranking of ponds or scheduling of ponds for relining should not be contingent upon water balance results.

We request that you provide such a ranking immediately. Such a ranking may be based on operational history, water quality analyses (brine content) of samples collected from the sumps inside the evaporation ponds and from collection trenches at the toes of the exterior dikes of some of the ponds, or any other defensible rational.

b) Pond Design Life - No information has been provided on the original design life of the existing pond liners. Based on previously submitted information the existing liners are approximately 19 years old. How much of the liners' design life has expired?

c) Relining Schedule - No justification has been provided for your pond relining schedule of 1 pond per year, beginning in 1990. Based on your current plan the relining would not be completed until the year 2013. At that time the ponds' last liner will be approximately 43 years old. How does this age compare with the liner's original design life?

4. Brine Lake (Section 3.4)

a) Water Balance Stipulation and Seepage Studies - The brine lake is also already known to leak, as demonstrated by the seepage through the left abutment of the tailings dam. A July 19, 1962 Texasgulf memo documents that the seepage flows through joints and fractures in the left abutment. From the MRP (Maps 2-2, 2-3, and 2-4) and Huntoon's 1985 Report (Figure 2) it is obvious that one major fault and a multitude of vertical and bedding plane joints underlie the brine lake. All of this data strongly suggest the existence of significant seepage losses from the brine lake.

An earlier request by DOGM, dated January 28, 1988 (Attachment A, Comment 4), that Moab Salt confirm the presence or absence of fracture grouting in the reservoir remains unanswered. No information has been provided by Moab Salt to show that these fractures do not transmit brine lake seepage.

The purpose of a water balance is to estimate the volume of leakage, not to determine if the leaks exist. Also, due to the range of uncertainty of the water balance, only direct evidence, such as that generated by hydrogeological studies could ascertain, with reasonable certainty, the absence or presence of brine lake leakage in the subsurface.

b) Brine Lake Seepage Studies - In your May 18, 1988 submittal you outlined a plan to conduct surface geophysical studies, install monitoring wells, conduct pump tests and undertake analytical or numeric modeling to assess any off-site brine migration from the brine lake. No explanation has been provided on why these details were omitted from the current plan. It appears that the brine lake leaks, therefore, geophysical, hydrogeological or other assessment studies should go on concurrently with any water balance evaluation. There is no apparent need to delay these studies.

Other Concerns

Salt Storage Area

Nowhere in your current plan does there exist any efforts to evaluate brine losses from the salt storage area. Such studies are appropriate based on the past history surrounding brine springs and wells TP-1, 2, and 3. This concern is also heightened by your active solution mining of salt in the storage area.

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